AMENDMENTS TO THE SPECIFICATION

Please replace the paragraph starting on page 21, line 8, with the following paragraph:

The force due to each LE has a magnitude given by the equation (2) in the direction of the spring. A LE does not occupy real space and has no mass. In one embodiment, the real space inside the deformable medium is occupied by some incompressible fluid of density d'.

Please replace the paragraph starting on page 20, line 16, with the following paragraph:

In a soft contact,[[-]] it is not the position but the force of the contact that is being considered. To obey the action-reaction law, the force applied to the external contact and to the object must have the same magnitude. This means that the external pressure [[P_{env}]] applied by the contact, $\underline{P_{env}}$, must be equal to $P_{env} = P_{ext} - P_{int}$. At the points on the object surface, where external contacts exist, a term is added to the right side of the equation (6), such that

$$E\Delta L/L - \Delta P = dgh + P_{env} \qquad (8)$$

Please replace the paragraph starting on page 27, line 7, with the following paragraph:

For a point ~~*P*~~ *Q* of the object, if the distance ||*O*~~*P*~~*Q*|| does not change between *t* and *t1*, and the velocity vectors ~~*P*~~*Q'* ≠ *O'* then ~~*P*~~*Q* described a spherical trajectory (a rotation) relative to *O* during this interval, that can be approximated by an arc connecting its initial and final relative positions. On the other hand, if the distance ||*O*~~*P*~~*Q*|| changes between *t* and *t1*, the trajectory can still be described as following a sphere having radius varying in time.

Please replace the paragraph starting on page 27, line 16, with the following paragraph:

To estimate the distance from a particle ~~P~~Z to its reference plane, consider that the position of *O* indicates the translation of the whole object (inside the coordinate system defined by the reference planes) and that the difference between the displacements of *O* and ~~P~~Z indicates a rotation of ~~P~~Z about *O*.

Please replace the paragraph starting on page 27, line 28, with the following paragraph:

To estimate the relative position of a particle ~~P~~Z with respect to O considering the spherical trajectory, compute the rotation of the particle about an axis crossing O. A 3D rotation of a point about an arbitrary axis is defined by

$$r = M.q \tag{14}$$

where M is a 3x3 matrix, $q = [q_x, q_y, q_z]$, the initial position, and $r = [r_x, r_y, r_z]$, the final position of the point.

Please replace the paragraph starting on page 28, line 7, with the following paragraph:

If a vector $o = [o_x, o_y, o_z]$ represents the position of O, then the final position of ~~P~~Z considering translation and rotation is defined by ~~P~~Z' = [~~p~~z'$_x$, ~~p~~z'$_y$, ~~p~~z'$_z$] $= [r_x + o_x, r_y + o_y, r_z + o_z]$. M is defined as:

$$M = uu^T + (cos(a))(I - uu^T) + sin(a)S \qquad (15)$$

where a is the rotation angle and u the rotation axis.

Please replace the paragraph starting on page 28, line 13, with the following paragraph:

The rotation axis u is defined by an unitary directional vector $u = v/||v|| = (x',y',z')^T$. S is defined as:

$$S = \begin{bmatrix} 0 & -z' & y' \\ z' & 0 & -x' \\ -y' & x' & 0 \end{bmatrix}$$

Considering $i, j, k \in \{x, y, z\}$ and a particle $\cancel{P}\underline{Z}$ belonging to the plane P_i, R_j is defined as the reference point at the intersection between plane P_i and P_j and R_k is defined as the reference point at the intersection between plane P_i and P_k. Two scalar values d_j, d_k are defined as $d_j = \cancel{p}\underline{z} - r_j$ and $d_k = \cancel{p}\underline{z} - r_k$ where $\cancel{p}\underline{z}$ is the displacement of $\cancel{P}\underline{Z}$, r_j is the displacement of R_j and r_k is the displacement of R_k. The vector v is defined using $v_i = 0$, $v_j = d_k$ and $v_k = -d_j$.

Please replace the paragraph starting on page 28, line 25, with the following paragraph:

The angle a of the rotation is defined by the difference $\cancel{p}\underline{z}$ - o between the displacements of $\cancel{P}\underline{Z}$ and O and the distance $\underline{d}_{\cancel{P}\underline{Z}v}$ between $\cancel{P}\underline{Z}$ and the rotation axis v. $\cancel{P}\underline{Z}$ is describing a circle around v, whose arc corresponds to $\cancel{p}\underline{z}$ - o. From the equation of the arc of a circle: $L = \phi.\underline{d}_{\cancel{P}\underline{Z}v}$, where $\underline{d}_{\cancel{P}\underline{Z}v}$ is the radius of the circle and $L = \cancel{p}\underline{z} - o$, the angle ϕ is obtained:

$$\phi = (\cancel{p}\underline{z} - o)/\underline{d}_{\cancel{P}\underline{Z}v} \qquad (16)$$

Please replace the paragraph starting on page 29, line 5, with the following paragraph:

Because ~~P~~Z belongs to P_i then $q_i = 0$. $q_j = \|\cancel{P}\underline{ZR_j}\|$ and $q_k = \|\cancel{P}\underline{ZR_k}\|$. As a result, $\cancel{p}\underline{z}'_i$ gives the distance from the particle to the plane P_i. $\cancel{p}\underline{z}'_j$ and $\cancel{p}\underline{z}'_k$ are not relevant.

Please replace the paragraph starting on page 14, line 3, with the following paragraph:

The present invention combines the simplicity and compliance of the static method with a 3D dynamic simulation of the deformable media. Highly deformable material, whether compressible or incompressible, can be simulated. Localized or global deformations can be simulated. The inventive long elements define an original and efficient 3D meshing strategy that permits the approximation of the state and the strain at any point in a volume from a reduced number of explicitly updated points while preserving/conserving the volume. The reduced, ~~n~~b^2 complexity of a LEM based meshing strategy, where ~~n~~b is the length of a side of the meshing subject, greatly shortens corresponding computing time and thus enhances simulation speed and performance, allowing fast and realistic interactive applications. For example, the complexity of collision detection may be simplified utilizing the LEM. Similarly, a LEM based simulation can simplify making topology changes such as cutting and removing material, enabling real time feedback and making it well suited for virtual surgical procedures. Furthermore, simulation models based on the inventive LEM may be superimposed. Superposition of these models permits modeling inhomogeneous materials such as hard tumor in soft tissue. Potential LEM applications include industrial design, character and animated object simulation, real time simulation of objects ranging from furniture to human organs.